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EKCO

E190 SERIES WEATHER RADAR TEST EQUIPMENT

PULSE GENERATOR TYPE E206

TECHNICAL INSTRUCTIONS

MP MASTER
MA24705

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ISSUE 2

RECORD OF REVISIONS COVERING MODS. TO UNIT

Pulse Generator E206			
SERVICE BULLETIN No.	UNIT MOD. No.	MANUAL REVISION SHEETS ADDED (DATE)	BY (INITIALS)
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Mod.1

Para.1, second line - for 'E190' read 'E190 and E290 frequency control units'.

Para.3, third line - read as follows:

Gating pulse	2uS or 4uS (selected by switch), 10V amplitude, positive and negative outputs available simultaneously.

Para.4(a), last line - read as follows:

and capable of being gated with a 2uS or 4uS pulse, as required, of up to 10V amplitude.

Nov.8/66

EKCO

PULSE GENERATOR TYPE E206

1. FUNCTION

The E206 is for use in conjunction with the ancillary items listed in para. 4, for setting up the E190 Frequency Control Unit, the STC characteristic of the IF amplifier, and for checking the exponential rundown of the STC waveform.

2. DESCRIPTION

The unit is supplied containing a stabilised power pack for connection to a 400 c/s 115V source, and is housed in a metal cabinet with a storage compartment for leads.

Coaxial sockets on the front panel provide four separate outputs, these being a trigger pulse for synchronising the monitoring oscilloscope (either the positive or negative edge may be used), a negative prepulse simulating the E190 prepulse and a gating pulse output for driving the associated signal generator. The latter output is available as both a positive and negative pulse, and is initiated by the trailing edge of a prepulse. Provision is made to delay its formation from this point by an interval of either 20 μSec or 320 μSec selected by a toggle switch on the front panel.

The unit is provided with a 6 ft unterminated flying mains lead.

3. SPECIFICATION

Oscilloscope trigger pulse	9V, prf 400 c/s
Prepulse	20 μSec -9V, prf 400 c/s locked to supply.
Gating pulse	2.2 μSec 10V, positive and negative outputs.
Gating pulse delay	20 μSec or 320 μSec from trailing edge of prepulse.
Gating pulse output impedance	500Ω approximately.
Mains input	115V, 400 c/s.

NOTE: The above output pulses are subject to a ±10% variation in amplitude due to Zener Diode tolerances.

4. ANCILLARY UNITS

The following ancillary units will be required for use with the E206.

(a) Ekco Signal Generator Type E199 or any other generator covering the E190 IF and capable of being gated with a 2.2 μS pulse of up to 10V amplitude.

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Para.(b) - read as follows:

High speed d.c. coupled single beam CRO to display 2uS or 4uS pulses, as required.

(b) High Speed DC coupled single beam oscilloscope to display 2.2 μS pulses.

(c) Bench Connector Set as appropriate.

(d) Signal Generator Matching Unit Type M2255.

(e) Attenuator Type B117523/3.

(f) Testmeter Type E200.

(g) Adaptor Type SA2272

(h) Trimming Tool Type B117168.

(j) 6 ft coaxial generator output lead type SA2307, terminated with dissimilar coaxial sockets.

(k) 6 ft coaxial trigger pulse lead type SA2271, terminated with a Belling Lee coaxial plug at one end and in crocodile clips at the other end.

(l) 6 ft coaxial lead Type SA2284, terminated with a PR2 coaxial connector at one end and a Belling Lee coaxial plug at the other end, for connecting the gating pulse to the generator.

(m) 6 ft coaxial lead Type SA2285, terminated with a Belling Lee coaxial plug at each end, for connecting the E206 prepulse to the E202.

(n) 4 ft coaxial lead Type SA2142, terminated with a miniature two pin plug at one end and a Belling Lee coaxial plug at the other end, for connecting video output to the CRO.

5. CIRCUIT DESCRIPTION

VT1, VT7 with R3,C3,R4 form a 'flip-flop' circuit, which functions to isolate the pulse generator from the effects of spurious pulses and 'hash' on the 400 c/s mains supply line.

The input signal to the flip-flop is derived from the secondary winding on the 400 c/s mains transformer T1, via R2, thereby locking the flip-flop and hence the output prepulse to the supply frequency and fixing the prf at 400 c/s. R2 is a stand-off resistor to isolate VT1 from the low impedance of T1 secondary.

The flip-flop is triggered by the negative half-cycle of the sine wave, the positive half-cycle being shorted to chassis by a diode MR7 to prevent the reverse voltage rating of VT1 from being exceeded.

The second stage, VT2 and associated components, forms the prepulse generator. The square wave at VT7 collector is applied to the base of VT2, which is bottomed (conducting heavily) during the off period by virtue of the base connection returned to the negative line via RV1,R7.

On the arrival of the positive (trailing) edge of the square wave at VT2 base, VT2 is switched off until the charge acquired by C2 has leaked away via R7 and RV1. This time constant determines the width of the prepulse, which is set at 20 μSec

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Third para., third sentence - read as follows:

This stage functions similarly to the prepulse and delay circuits, with the pulse width determined by the time constant C5,R12, and either RV4 or RV5 as selected by S3.

Fourth para., first line - delete reference to 2.2uS.

by the preset control RV1. The prepulse then appearing at VT2 collector is clamped at -9V by a Zener diode, MR1, and brought out to socket SKT2. MR1 also functions to protect VT2 should a large signal be accidentally applied to SKT2 (by mis-connection, etc) since MR1 will then limit a negative signal to 9V or short circuit a positive signal. The prepulse available at SKT2 is also fed to SKT1, via a stand-off resistor, R1, where it provides an oscilloscope trigger signal. Either the positive or negative edge may be used for synchronising.

The following stage, VT3, with associated components, is the gating pulse delay generator and functions similarly to the prepulse generator. The width of the pulse determines the interval between the formation of the trailing edge and the prepulse from which it is derived. It is the trailing edge of the pulse which is used to trigger the gating pulse generator. Two intervals of 20 µSec or 320 µSec are available, set by the preset time constant controls RV2, RV3 and selected by the toggle switch, S1.

The delay pulse at VT3 collector is directly coupled to the base of a DC amplifier VT4, the function of which is to invert the delay pulse and sharpen the trailing edge. As the trailing edge is then negative, an NPN type transistor is required in the following stage VT5, which is the gating pulse generator. This stage functions similarly to the prepulse and delay circuits, C5, R12 and the preset control RV4 forming the time constant determining the pulse width. The positive output appearing at VT5 collector is brought out to SKT3, and is also directly coupled to the base of a further NPN transistor, VT6, for producing a negative output. The series resistor, R14, is necessary to increase the effective output impedance of VT5.

Since R14 delays the transfer of the extremely short gating pulse (2.2 µSec) a 'speed-up' capacitor, C6, is included for signal coupling. The pulse appearing at VT6 collector, having undergone a 180 degrees phase reversal, provides a negative output at SKT4. The Zener diodes, MR2, MR3, clamp the gating pulse at 10V and also function as safety diodes similarly to MR1.

The power supply is derived from a mains transformer, T1, double pole switched by S2, with a neon indicator, LP1, in series with R18 across the primary as a pilot indicator.

NOTE: R18 is integral with LP1.

Output from the centre-tapped secondary winding is full-wave rectified by the rectifiers, MR5, MR6, and filtered by R16 and the reservoir and smoothing capacitors, C10, C9. The negative HT line is then clamped at 12.5V ±10% by the Zener diode, MR4, operating in conjunction with the smoothing resistor, R16, which also functions as a current limiter for MR4.

6. SPARE PARTS LIST

6.1. RESISTORS, FIXED

Cir.Ref.	Ohms	%	Type	Part No.
R1	10K	10	RC7J	5905-99-022-2131
R2	47K	10	RC7J	" " " 2215
R3,4	1K	10	RC7J	" " " 2005

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Add the following to the parts list:

Resistor, variable, RV5, 10K ±20%, part number 5905-99-013-0258.

Switch, toggle, part number 5930-99-051-0554

Cir.Ref.	Ohms	%	Type	Part No.
R7	8.2K	10	RC7J	5905-99-022-2122
R8,13,15	470	10	RC7J	" " " 1194
R9,12	4.7K	10	RC7J	" " " 2089
R10	5.6K	10	RC7J	" " " 2101
R11	1.5K	10	RC7J	" " " 2026
R14	15K	10	RC7J	" " " 2152
R16	680	5	Wirewound	" " 011-3393
R17	39K	10	RC7J	" " 022-2206
R18	120K	10	RC7K	" " " 3049

6.2. RESISTORS, VARIABLE

Cir.Ref.	Ohms	%	Type	Part No.
RV1	25K	20	RVC15A	5905-99-011-9466
RV2,4	10K	20	RVC15A	" " " 9465
RV3	250K	20	RVC15A	" " " 9469

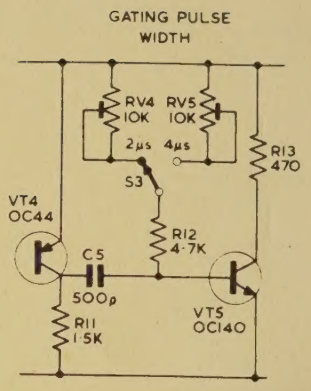
6.3. CAPACITORS

Cir. Ref.	Capacity	V.Wkg.	Type	Part No.
C1	0.03 µF	250	Paper	5910-99-012-0115
C2,4	0.003 µF	500	Paper	" " " 0121
C3	2 µF	150	Paper	" " 011-5572
C5	500 pF	500	Paper	" " " 0118
C6	150 pF	350	Mica	" " 012-5311
C7	0.01 µF	150	Paper	" " 011-5560
C9	50 µF	25	Electrolytic	C116692/14T
C10	8 µF	150	Electrolytic	C116692/20T

6.4. OTHER COMPONENTS

Component	Cir.Ref.	Part No.
Transistor, GET 106	VT1	58059
" OC42	VT2	58214
" OC44	VT3,4	56819
" OC140	VT5,6	57898
" OC202	VT7	57478
Diode, Zener, Z2A100	MR1	57899
" " Z2A120	MR2,3	57900
" " Z2A130	MR4	57934
" BTH-GJ5-M	MR5,6	57935
" Mullard. OA202	MR7	57090
Switch, toggle	S1,S2	5930-99-051-0554
Transformer	T1	SA2281
Lamp, pilot	LP1	B116294/2
Socket, coaxial	SKT1,2,3,4	A4110

E206 Additional switch S3 and potentiometer
Mod. 1 RV5 added as shown.



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